

Work Order ID 138648

November 06, 2015 10:14:38 AM

138648

Page 1

Item ID: D350-748-203

Accept

N900040100

Setup Start *NS1*

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Stop *NS2*

Start Date: 11/6/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/20/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

SH

Date: 20151106 Tooling:

Date:

Run Start *NR1*

QC:

Date: SPC (Y/N):

Date:

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-243	A URF OK	UP. 15/11/6	DAS	6					MCS 15-11-26
100	Document Control	0.00							
100	DOCUMENT CONTROL								
DC	Memo	0.00							
Doc.Control -USB or Paperwork	Photocopy bluefile & type labels per PPPD350-748-201		CHG001						
110	BENDING MACHINE - CROSSTUBES	0.00							
110									
CNC Bend 2	Memo	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D350-748-243 using CNC bender program D350A and Folio FT								
	*****UNDER BEND .225" PER SIDE*****								
	****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****								

D350-748-203/138648

DQA:

Date:

16/02/64

WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed:

Date:

16/02/03

Work Order update only ☐

Work Order: <u>138648</u>		DISPOSITION		AGAINST DEPARTMENT/PROCESS							
Part No. <u>D350-748-203</u>		Rework ☒		Skid-tube ☐		Cross tube ☐		Water Jet ☐		Engineering ☒	
NCR No. <u>16-55766</u>		Scrap ☐		Machining ☐		Small Fab ☐		Prod. Eng. Coord. ☐		Quality ☐	
		Use-as-is ☐		Thermoforming ☐		Finishing ☒		Rec/Store/Packaging ☐		Other ☐	
		Suspected Unapproved ☐		Large Fab ☐		Composite ☐		Supplier ☐			
Date: <u>15/11/6</u>		Step #: <u>180</u>		QTY Effective: <u>0</u>				MRB (QSI042) Approval			
Description Work Order Deviation				Disposition				DAS 12 9-89 15/11/6			
USE AXALTA PRE-TREATMENT PER QSI 005				AXALTA 1320SS Cleaner BIN 132520 AXALTA 2305 Adhesion Promoter BIN 132474				Completed By			
								DAS 41 9-89 15-11-23			
								Lead hand / Supervisor Approval Verification			
								DAS 9 9-89 DEC 03 2015			
QC / QA Coordinator Approval				DAS 9 9-89 DEC 03 2015							
Root Cause						FAULT CATEGORY					
Environment ☐ No Re-verification ☐ Design ☐ Operator ☐ Doc/Data ☐ Offset/Setup ☐ Equip/Tooling ☐ Supplier ☐ Handling/Pre ☐ Training ☐ Material ☐ Use for Testing ☐ Internal Transport ☐ Poor Information ☐ Tribal Knowledge ☐ Rushing ☐ LOA ☒ Product Improvement ☐ Substation ☐ Process Improvement ☐ Past Expiry Date ☐ Manufacturing Process ☐ Misidentified ☐ Past Due ☐						Pressure/Forced ☐ Temperature/Cure ☐ Power Loss/Surge ☐ Positioned Wrong ☐ Bending ☐ Set-up ☐ Folio/Program ☐ Outside Dimensions ☐ Centre Not Concentric ☐ BOM/Route ☐ Grain ☐ Over/Under tolerance ☐ Cracks ☐ Broken/Damage/Defect ☐ Weld ☐ Part Incorrect ☐ Crimp/Kink/Ripple/Wave ☐ Inspection Incomplete/Unqualified ☐ Wrong Stock Pulled ☐ Part Lost/Missing ☐ Cuffs ☐ Contamination ☐ Out of Sequence ☐ Part Moved ☐ Crushing ☐ Countersink ☐ Off-set ☐ Drawing ☒ Heat Treat ☐ Cut Too Short ☐ Mislabeled ☐ Finish ☐ Wave/Twist in Tube ☐ Instructions Incomplete/Unclear ☐ Fit/Function ☐ Misread ☐ Marks/Chatter ☐ Drill Holes ☐ Misaligned/off center ☐ Turning Sequence ☐					
OTHER: ☐											

Work Order ID 138648

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Page 2

Item ID: D350-748-203 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
Item Name: AS350 / AS355 Stainless Steel Aft Crosstube
Start Date: 11/6/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 11/20/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							

120

Crosstubes

Crosstubes

Memo

VERIFY CROSSTUBE DIMENSIONS AS PER DWG

U/A 15-11-16 9-89
P.T.O.

127

QC15- Crosstube Dimensional Check

0.00

127

QC

Quality Control

Memo

MARK CUT LINES

DAS 03 9-89

DP 15-11-16

128

0.00

128

Crosstubes

Crosstubes

Memo

CUT TUBE AT HEIGHT ON FAI SHEET

VERF HEIGHT 31.35 BY QC 15 LEVEL INSPECTOR EB

VERF TWIST 1009 BY QC15 LEVEL INSPECTOR EB

BCL 15/11/16

DQA: _____ Date: _____

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: _____ Date: _____

Work Order update only ☒

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : <u>15-11-20</u>	Step #: <u>120</u>	QTY Effective : _____		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
Remove step 120. Not use on stainless steel darts tube. And step Done. 9 9-88					
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
OTHER : _____					

Work Order ID 138648

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Page 3

Item ID: D350-748-203

Accept

N900040100Setup Start ***NS1***

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Stop ***NS2***

Start Date: 11/6/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/20/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

130

0.00

130

Crosstubes

Crosstubes

Memo

0.00

2- Drill Tube as per Dwg D350-748-243 Using DT8876 Drill Jigs,
Set-up drill table as per QSI 010

3 -Deburr

4- Engrave Part # and Batch # as per Dwg D350-748-243

5-Remove all marks from tube within limits of D350-748-243

BC 15/11/18

BC 15/11/19

140

QC6- Inspect dimensions to drawing

0.00

140

QC

Quality Control

QCS
DAS 15-11-20
9 Memo
9-89① 15/11/20 DAS
9
9-89

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :				MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval	
Description Work Order Deviation				Disposition					

Root Cause				FAULT CATEGORY							
Environment	☐	No Re-verification	☐	Pressure/Forced	☐	Temperature/Cure	☐	Power Loss/Surge	☐	Positioned Wrong	☐
Design	☐	Operator	☐	Bending	☐	Set-up	☐	Folio/Program	☐	Outside Dimensions	☐
Doc/Data	☐	Offset/Setup	☐	Centre Not Concentric	☐	BOM/Route	☐	Grain	☐	Over/Under tolerance	☐
Equip/Tooling	☐	Supplier	☐	Cracks	☐	Broken/Damage/Defect	☐	Weld	☐	Part Incorrect	☐
Handling/Pre	☐	Training	☐	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified	☐	Wrong Stock Pulled	☐	Part Lost/Missing	☐
Material	☐	Use for Testing	☐	Cuffs	☐	Contamination	☐	Out of Sequence	☐	Part Moved	☐
Internal Transport	☐	Poor Information	☐	Crushing	☐	Countersink	☐	Off-set	☐	Drawing	☐
Tribal Knowledge	☐	Rushing	☐	Heat Treat	☐	Cut Too Short	☐	Mislabeled	☐	Finish	☐
LOA	☐	Product Improvement	☐	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear	☐	Fit/Function	☐	Misread	☐
Substation	☐	Process Improvement	☐	Marks/Chatter	☐	Drill Holes	☐	Misaligned/off center	☐	Turning Sequence	☐
Past Expiry Date	☐	Manufacturing Process	☐	OTHER :							
Misidentified	☐	Past Due	☐								

Work Order ID 138648***138648***

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Item ID: D350-748-203

Accept

N900040100

Setup Start

NS1

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Stop

NS2

Start Date: 11/6/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/20/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

174

Outsource process - NDT per QSI038 4.1

0.00

174

Outsource2

Memo

0.00

Outsource process - NDT

ISSUE P/O TO ACCUREN: 30533

NOV 23 2015

CL

1

176

Receive & Inspect for Damage & Mat'l Certs

0.00

176

Packaging

Memo

0.00

Packaging

IX 8015-11-23

178

QC5- Inspect part completeness to step on W/O

0.00

178

QC

Memo

0.00

Quality Control

DAS
33
9-89

NOV 27 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐							
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval				
Description Work Order Deviation				Disposition							
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐		☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due		☐ Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter		FAULT CATEGORY ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes		☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center		☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence	
OTHER : _____											

Work Order ID 138648***138648***

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Item ID: D350-748-203

Accept

N900040100Setup Start ***NS1***

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Stop ***NS2***Start Date: 11/6/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 11/20/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center:ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	SprayPaint	0.00				1			DAS 41 9-89
180									15-11-23
SprayPaint	Memo	0.00							
Spray Painting	* PTO 1-Prime inside and out crosstube as per QSI 005 4.2 BATCH: <u>133084</u>								
	2-Paint Outside of Tube as per Dart QSI 005 4.2 BATCH: <u>133325</u>								
190	QC14- Inspect Spray Paint	0.00				1			DAS 39 9-89
190									NOV 27 2015
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

DQA: _____ Date: _____

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: <u>138648</u> Part No. <u>D350-748-203</u> NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td>Skid-tube ☐</td> <td>Cross tube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐																						
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐																						
Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐																						
Large Fab ☐	Composite ☐	Supplier ☐																							
Date : _____		Step #: _____		QTY Effective : _____			MRB (QSI042) Approval																		
Description Work Order Deviation				Disposition																					
Prep surface per QSI 005 4.1.4				Axalta 132055 B/N: 132520 Axalta Metalfab B/N: 132474				Completed By 15-11-23																	
								Lead hand / Supervisor Approval Verification																	
								QC / QA Coordinator Approval																	

Root Cause				FAULT CATEGORY			
Environment ☐		No Re-verification ☐		Pressure/Forced ☐		Temperature/Cure ☐	
Design ☐		Operator ☐		Bending ☐		Set-up ☐	
Doc/Data ☐		Offset/Setup ☐		Centre Not Concentric ☐		BOM/Route ☐	
Equip/Tooling ☐		Supplier ☐		Cracks ☐		Broken/Damage/Defect ☐	
Handling/Pre ☐		Training ☐		Crimp/Kink/Ripple/Wave ☐		Inspection Incomplete/Unqualified ☐	
Material ☐		Use for Testing ☐		Cuffs ☐		Contamination ☐	
Internal Transport ☐		Poor Information ☐		Crushing ☐		Countersink ☐	
Tribal Knowledge ☐		Rushing ☐		Heat Treat ☐		Cut Too Short ☐	
LOA ☐		Product Improvement ☐		Wave/Twist in Tube ☐		Instructions Incomplete/Unclear ☐	
Substation ☐		Process Improvement ☐		Marks/Chatter ☐		Drill Holes ☐	
Past Expiry Date ☐		Manufacturing Process ☐		OTHER : _____			
Misidentified ☐		Past Due ☐					

Work Order ID 138648

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138648

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Item ID: D350-748-203 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: URF 15-561 Stop ***NS2***
 Item Name: AS350 / AS355 Stainless Steel Aft Crosstube
 Start Date: 11/6/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 11/20/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200	Crosstubes	0.00				1			DAS 38 9-89 15-11-24
200									
Crosstubes	Memo	0.00							
Crosstubes	INSTALL GROUND WIRE INSERT, THEN INSERT SCREW AND WASHER								
	1-Abraide mating surfaces of support and crosstube with 180 grit sandpaper, clean the area with MEK or equivalent as per dwg								
	2-Install supports with Proseal 890 per D350-748-243 and QSI 015								
	A/R Proseal 890 Batch: <u>133071</u>								
	EXP: <u>2/16</u>								
	3-Install supports clamps Using Dt8876 as per Dwg D350-748-243,Torque to 60-80 IN-LBS.								
	PROSEAL CURE TIME 72 HOURS:								
	Start: <u>15-11-24</u>								
	Finish: <u>15-11-27</u>								
210	QC5- Inspect part completeness to step on W/O	0.00				1			DAS 38 9-89 NOV 27 2015
210									
QC	Memo	0.00							
Quality Control	***RE-CHECK TORCQUE ON CLAMP AFTER PROSEAL HAS CURED FOR 72HOURS AS PER DWG.***								

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					

Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐				FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
				OTHER :			

Work Order ID 138648

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Item ID: D350-748-203

Accept

N900040100

Setup Start ***NS1***

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Stop ***NS2***

Start Date: 11/6/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 11/20/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***
Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

220

Pick Kit

0.00

220

Packaging

Memo

0.00

Packaging

NOV 27 2015

DAS
28
9-89

DAS
28
9-89

230

QC4- 100% Inspect kits for completeness

0.00

230

QC

Memo

0.00

Quality Control

1X

DAS
28
9-89

NOV 27 2015

240

Packaging

0.00

240

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPPD350-748-203

Location: _____

PPP Rev: _____

1X

DAS
28
9-89

NOV 27 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐		Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐					
		OTHER : ☐							

Work Order ID 138648***138648***

Page 8

Item ID: D350-748-203

Accept

N900040100Setup Start ***NS1***

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Stop ***NS2***

Start Date: 11/6/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/20/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

250

QC21- Final Inspection - Work Order Release

0.00

250

QC

Memo

0.00

Quality Control

ML5 15-11-27

MF
15-11-27

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width:100%; text-align: center;"> <tr> <td>Skid-tube ☐</td> <td>Cross tube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐																				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER :																							
Misidentified ☐	Past Due ☐																								

Picklist Print

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Page 1

Work Order ID: 138648

138648

Parent Item: D350-748-203

D350-748-203

Parent Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Start Date: 11/6/2015

Required Date: 11/20/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV:A 15.03.23 NEW ISSUE DD VERF;JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D350-748-243TRN

Manufactured

No

Each

8.0000

1

D350-748-243TRN

Crosstube Installation, High Aft

BL 15/11/13

Location

Loc Qty

Loc Code

LG003

8

135163

1

135164

1

135165

1

135166

1

135167

1

135168

1

135169

1

135170

1

D3502-1

Manufactured

No

Each

28.0000

2

D3502-1

Support

DAS

41

9-89

15-11-26

Location

Loc Qty

Loc Code

LG052

28

130349

28

Each

74.0000

2

D5123-7

Manufactured

No

D5123-7

Clamp Cushion

DAS

41

9-89

15-11-26

Location

Loc Qty

Loc Code

LG052

74

131194

16

133492

12

136671

26

137766

20

Picklist Print

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Page 2

Work Order ID: 138648

138648

Parent Item: D350-748-203

D350-748-203

Parent Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Start Date: 11/6/2015

Required Date: 11/20/2015

Start Qty: 1.00

Required Qty: 1.00

AETC-1032

Purchased

No

Each

20.0000

1

DAS
41

9-89

15-11-24

AETC-1032

Insert

**

Location

Loc Qty

Loc Code

ST547

20

m133002

20

Each

1,068.000

1

DAS
41

9-89

15-11-24

NAS1149C0363R

Purchased

No

NAS1149C0363R

Washer

**

Location

Loc Qty

Loc Code

FP001

31

114742

31

GA

506

m133077

506

ST260a

494

m133077

494

ST271

37

m132763

37

Each

157.0000

2

DAS
41

9-89

15-11-26

MS21920-20

Purchased

No

MS21920-20

Clamp

**

Location

Loc Qty

Loc Code

FG

2

122254

2

LG050

25

m133483

25

LG056

130

m128650

13

m132675

67

m133134

50

2

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Work Order ID: 138648

138648

Parent Item: D350-748-203

D350-748-203

Parent Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Start Date: 11/6/2015

Required Date: 11/20/2015

Start Qty: 1.00

Required Qty: 1.00

MS51958-63

Purchased

No

Each

41.0000

1

DAS

41

9-89

15-11-24

MS51958-63

Screw

**

Location

Loc Qty

Loc Code

ST273

41

m131886

41

1

NAS1149D0563J

Purchased

No

220

Each

1,227.000

8

8

NAS1149D0563.J

Washer

**

Location

Loc Qty

Loc Code

GA

53

m125807

53

ST260a

928

m130799

63

m132035

55

m132256

10

m133134

300

m133363

500

ST269

227

m128257

156

m132677

71

ST271

19

m131026

19

DAS
28
9-89

NOV 26 2015

DAS

6

9-89

DAS

26

9-89

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Work Order ID: 138648

138648

Parent Item: D350-748-203

D350-748-203

Parent Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Start Date: 11/6/2015

Required Date: 11/20/2015

Start Qty: 1.00

Required Qty: 1.00

MS21042L4

Purchased

No

220

Each

2,350.000

24

24

MS21042L4

Locknut

Location

Loc Qty

Loc Code

FP001

2

m124231

2

GA

67

m127813

67

ST260a

138

m130799

56

m131803

6

m132262

76

ST303

1974

m133363

1974

ST305

169

m128300

8

m130388

7

m130922

97

m132123

56

m133316

1

DAS
28
9-88

NOV 17 9 17 AM

DAS
6
9-88

DAS
26
9-88

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Work Order ID: 138648

138648

Parent Item: D350-748-203

D350-748-203

Parent Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Start Date: 11/6/2015

Required Date: 11/20/2015

Start Qty: 1.00

Required Qty: 1.00

MS21042L5

Purchased

No

220

Each

473.0000

4

4

MS21042L5

Nut

DAS
26
9-89
DAS
6
9-89

Location

Loc Qty

Loc Code

GA

146

m127813

146

ST303

79

m132677

79

ST304

200

m133363

200

ST305

48

m127813

19

m131340

21

m132123

8

DAS
26
9-89

4

AN4-41A

Purchased

No

220

Each

287.0000

8

8

AN4-41A

Bolt

DAS
26
9-89

Location

Loc Qty

Loc Code

ST312A

238

m130726

8

m132189

130

m133483

100

ST342

49

m130716

49

DAS
26
9-89

8

2015

DAS
6
9-89

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Work Order ID: 138648

138648

Parent Item: D350-748-203

D350-748-203

Parent Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Start Date: 11/6/2015

Required Date: 11/20/2015

Start Qty: 1.00

Required Qty: 1.00

D3501-1 Manufactured No 220 Each 419.0000 16 16

D3501-1

Bushing

DAS
26
9-89

DAS
28
9-89

Location	Loc Qty	Loc Code
ST039	112	
130742	14	
135919	98	
ST046	1	
125925	1	
ST051A	306	
135918	306	

DAS
6
9-89

DAS
26
9-89

NAS1149D0463J

Purchased No

220 Each 5,204.000 32 32

NAS1149D0463.J

WASHER

Location	Loc Qty	Loc Code
GA	626	
M129390	41	
M132035	585	
ST260a	3136	
M133284	1636	
M133316	1500	
ST269	1442	
M129682	47	
M130799	371	
M132317	101	
M132677	888	
M133077	35	

NOV 26 2015

DAS
6
9-89

Picklist Print

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Work Order ID: 138648

138648

Parent Item: D350-748-203

D350-748-203

Parent Item Name: AS350 / AS355 Stainless Steel Aft Crosstube

Start Date: 11/6/2015

Required Date: 11/20/2015

Start Qty: 1.00

Required Qty: 1.00

AN5-32A

Purchased No

220 Each

219.0000 4 4

AN5-32A

Bolt

Location

Loc Qty

Loc Code

ST299A

180

m132857

30

m133323

150

ST336

32

m132536

32

ST337

7

m131139

7

D3500-1

Manufactured No

220 Each

11.0000 4 4

D3500-1

Saddle

Location

Loc Qty

Loc Code

ST406

11

129373

10

131168

1

AN4-6A

Purchased No

220 Each

662.0000 16 16

AN4-6A

BOLT

Location

Loc Qty

Loc Code

CA

143

M128403

43

M130851

100

ST325A

100

M133363

100

ST345

419

M128403

8

M133316

411

DAS
28
9-89

NOV 7 6 2015

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Page 7

Item	Qty -243	Part Number	Description
1	X	D350-748-243	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6021-125	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D5123-7	CLAMP CUSHION
5	1	AETC-1032	INSERT
6	2	MS21920-20 OR MS21920-21/-22	CLAMP (PER DART SPEC. M-MS21920-20/-21/-22)
7	1	NAS1149C0363R	WASHER (OR AN960C10)
8	1	NAS1635-3-8	SCREW (OR MS51958-63)
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6021-125
FINISHED LENGTH AFTER TURNING = 124.70±0.06 (AFTER BENDING/TRIMMING = 122.70 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-243" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.290 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 12) MAX AMPLITUDE OF RIPPLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 13) MAX TWIST: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

RELEASED

2015 MAR 18

ECN 15-547

UNDER REVIEW

15/14/28

URF 15-547

20151106

SH 138648

A	NEW ISSUE	CP	15.01.21
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	15.01.21		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D350-748-243	REV. A SHEET 1 OF 4
TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE NTS
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DQA: _____ Date: _____

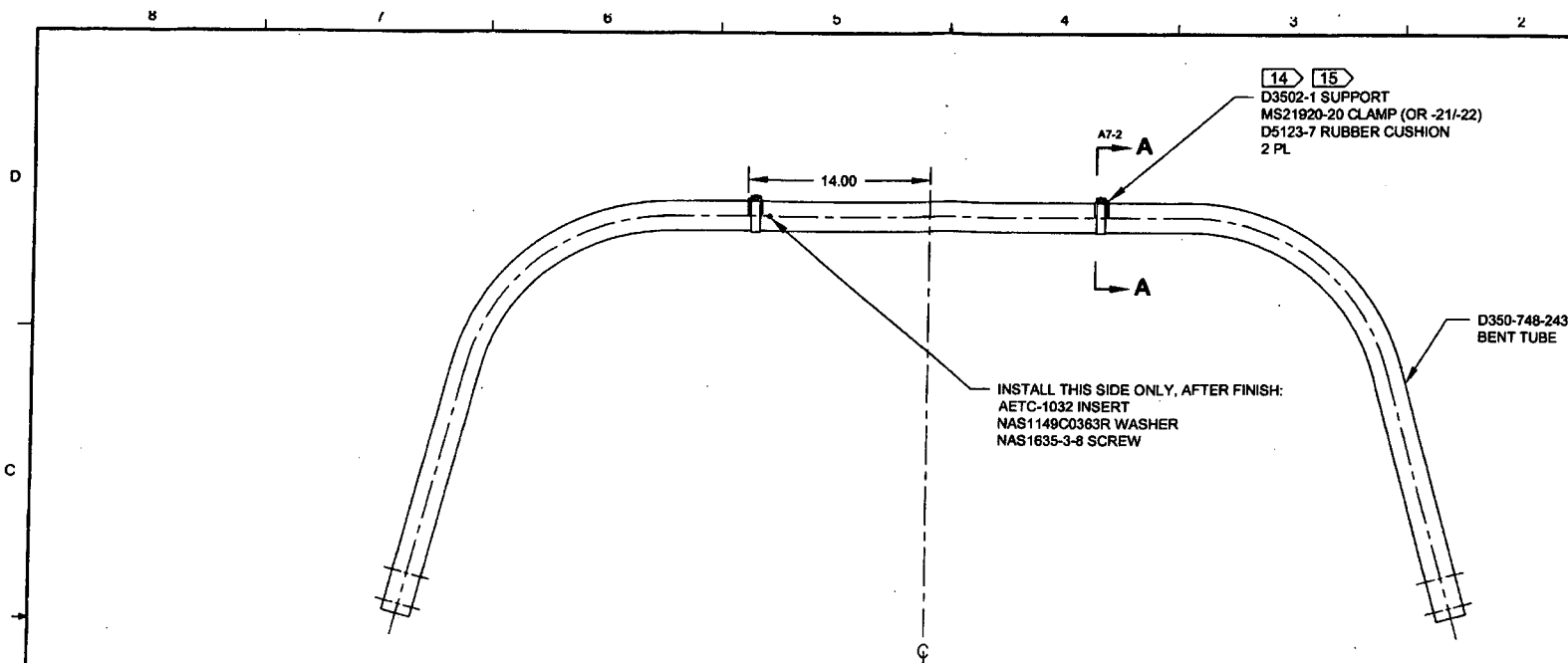


WORK ORDER NON-CONFORMANCE / UPDATE

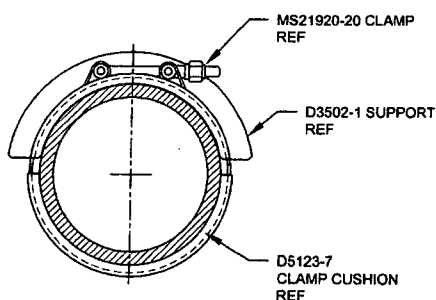
QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width:100%; border: none;"> <tr> <td style="width:15%;">Skid-tube ☐</td> <td style="width:15%;">Cross tube ☐</td> <td style="width:15%;">Water Jet ☐</td> <td style="width:15%;">Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																															
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		OTHER : ☐																																																																					



**D350-748-243
ASSEMBLY DETAIL**



**SECTION A-A D4-2
SCALE 6X**

UNDER REVIEW

15/1/21

RELEASED

2015 MAR 18

DESIGN	g	DART AEROSPACE LTD	
DRAWN	g	HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.		D350-748-243	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS UNDERSTANDING THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

DQA: _____ Date: _____

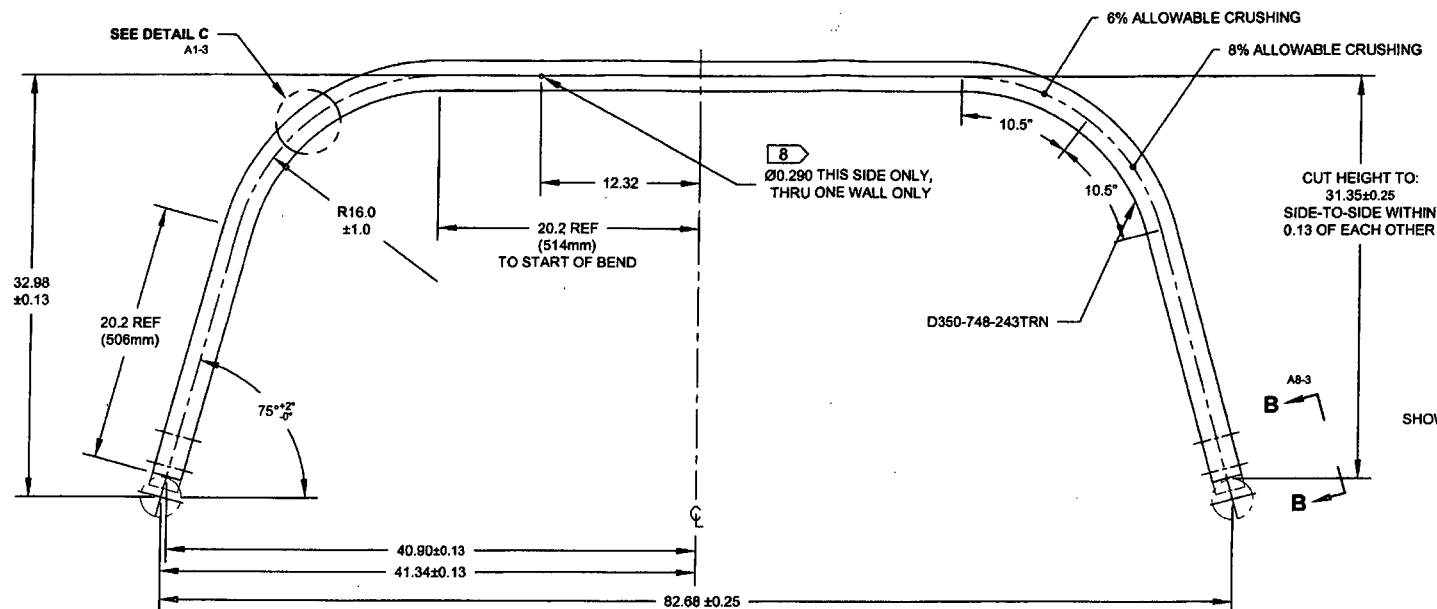


WORK ORDER NON-CONFORMANCE / UPDATE

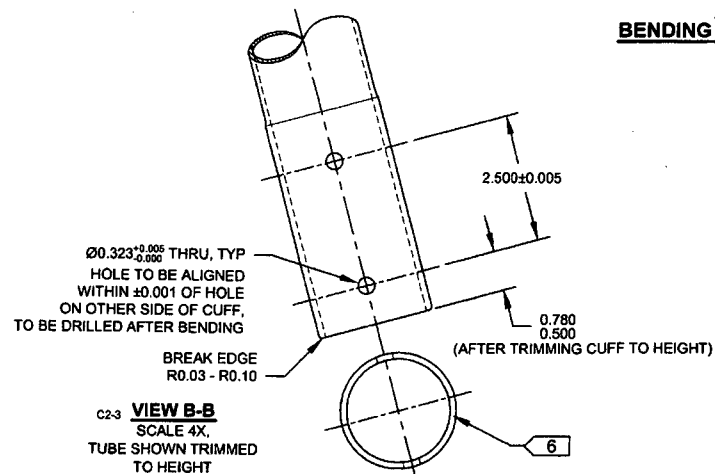
QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
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Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____							
Misidentified ☐	Past Due ☐								



D350-748-243
BENDING AND DRILLING DETAIL 11



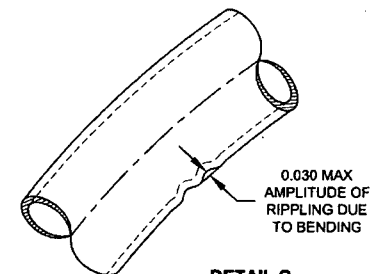
VIEW B-B
SCALE 4X,
TUBE SHOWN TRIMMED
TO HEIGHT

RELEASED

2015 MAR 18

UNDER REVIEW

15/14/17



DETAIL C D7-3
SCALE 4X
RIPPING EXAGGERATED

DESIGN	AP	DART AEROSPACE LTD	
DRAWN	AP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.	<i>[Signature]</i>	D350-748-243	SHEET 3 OF 4
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DE APPR.	<i>[Signature]</i>	CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD	
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DQA: _____ Date: _____

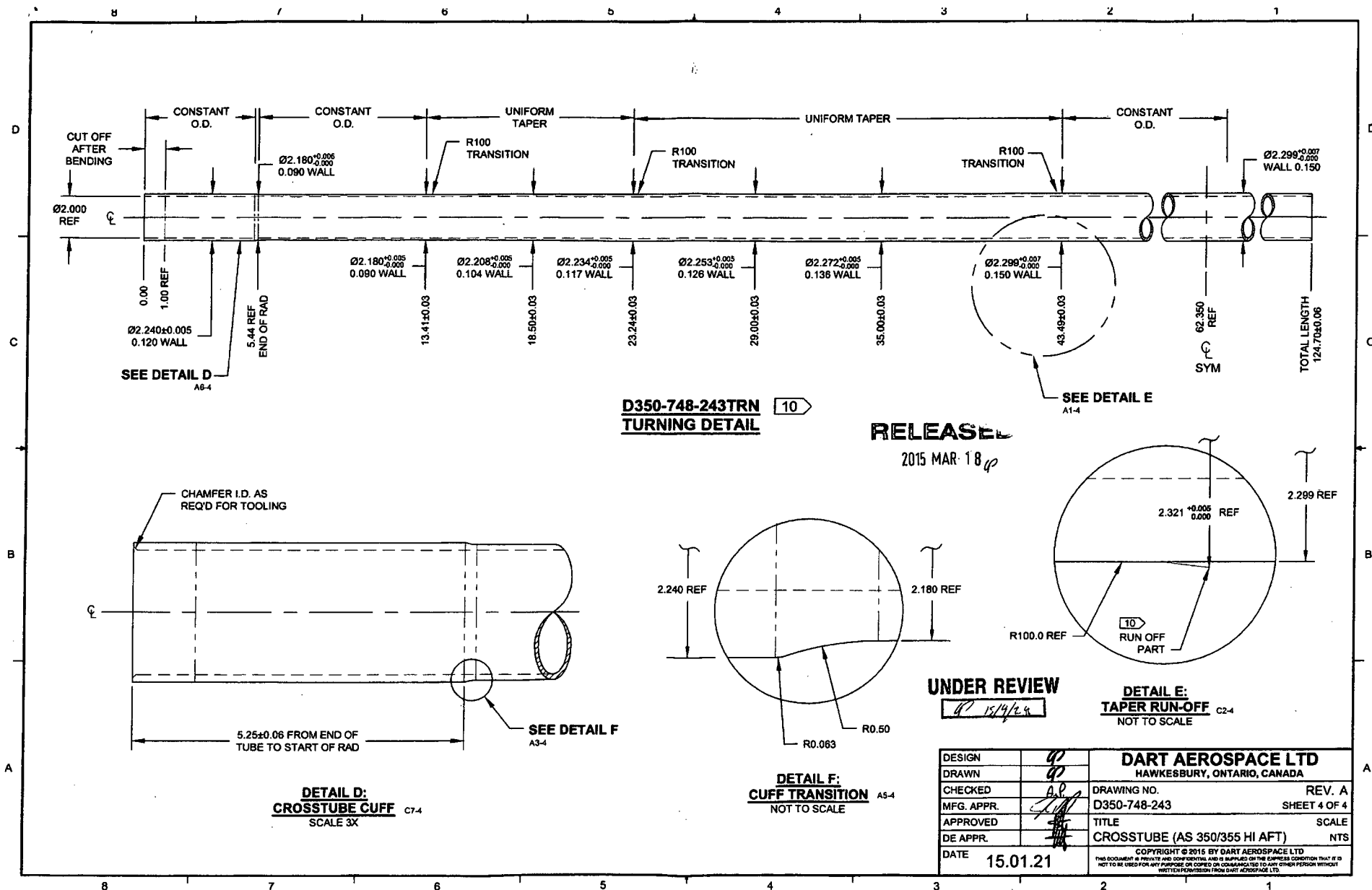


WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐							
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Description Work Order Deviation				Disposition							
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐		☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due		FAULT CATEGORY ☐ Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter		☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes		☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center		☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence	
				OTHER :							



DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

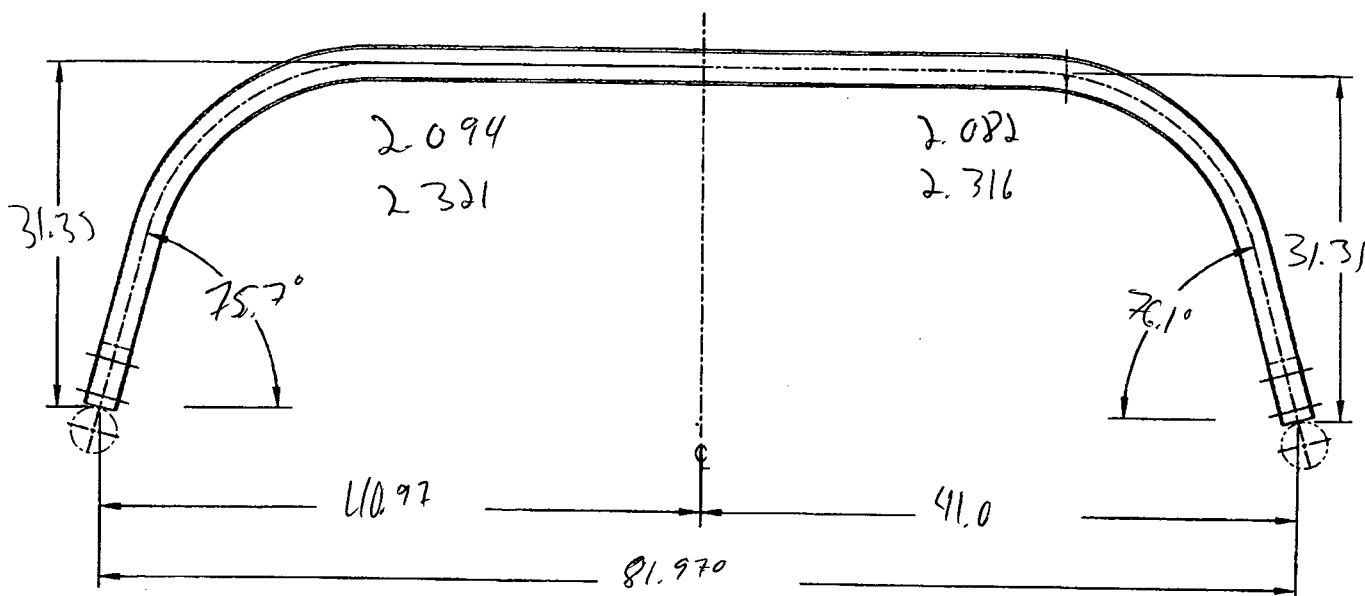
Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					

Root Cause				FAULT CATEGORY							
Environment	☐	No Re-verification	☐	Pressure/Forced	☐	Temperature/Cure	☐	Power Loss/Surge	☐	Positioned Wrong	☐
Design	☐	Operator	☐	Bending	☐	Set-up	☐	Folio/Program	☐	Outside Dimensions	☐
Doc/Data	☐	Offset/Setup	☐	Centre Not Concentric	☐	BOM/Route	☐	Grain	☐	Over/Under tolerance	☐
Equip/Tooling	☐	Supplier	☐	Cracks	☐	Broken/Damage/Defect	☐	Weld	☐	Part Incorrect	☐
Handling/Pre	☐	Training	☐	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified	☐	Wrong Stock Pulled	☐	Part Lost/Missing	☐
Material	☐	Use for Testing	☐	Cuffs	☐	Contamination	☐	Out of Sequence	☐	Part Moved	☐
Internal Transport	☐	Poor Information	☐	Crushing	☐	Countersink	☐	Off-set	☐	Drawing	☐
Tribal Knowledge	☐	Rushing	☐	Heat Treat	☐	Cut Too Short	☐	Mislabeled	☐	Finish	☐
LOA	☐	Product Improvement	☐	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear	☐	Fit/Function	☐	Misread	☐
Substation	☐	Process Improvement	☐	Marks/Chatter	☐	Drill Holes	☐	Misaligned/off center	☐	Turning Sequence	☐
Past Expiry Date	☐	Manufacturing Process	☐	OTHER : _____							
Misidentified	☐	Past Due	☐								

DART AEROSPACE LTD		Work Order:	138648
Description: Crosstube High Aft, SS (AS350/355)		Part Number:	D350-748-203
Inspection Dwg: D350-748-243	Rev: A	Page 1 of 1	

Required Dimension	Min	Max
Height	31.10	31.60
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06
Bending Passes	7	--
Crushing	--	8%
Twist	--	0.38



	Side A	Side B
Bending Passes	29	32
Crushing	5.1%	4.7%
Comments		

QC15 Inspection	DP
Date	

15-11-16

Rev	Date	Change	Revised by	Approved
A	15.09.09	New Issue	KJ	



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO30533

Purchase Order Date 11/20/2015

PO Print Date 11/23/2015

Page Number 4 of 6

Order From :
SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

VC-SKY001

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Vendor Phone

905-678-5636

Ship To Contact

Ship To Phone

Ship Via:

Delivered

Ship Acct:

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

CAD

FOB

FCA - (Free Carrier)

Line Total: \$115.00

9 138648

D350-748-203
CROSSTUBE

11/23/2015

1.00

\$115.00

\$115.00

Yes

11/23/2015

SAME AS ABOVE

SP15-11-23
Line Total: \$115.00

10 138649

D350-748-203
CROSSTUBE

11/23/2015

1.00

\$115.00

\$115.00

Yes

11/23/2015

SAME AS ABOVE

Line Total: \$115.00

11 138650

D350-748-203
CROSSTUBE

11/23/2015

1.00

\$115.00

\$115.00

Yes

11/23/2015

SAME AS ABOVE

Note:

11/23/2015

**skyservice****Work Order Traveler**

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO26474	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 30533
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 13 CROSSTUBES AS PER PO30533

2 AFT CROSSTUBES, ITEM ID# D212-664-207 , WORK ORDERS ID# 136710, 138508

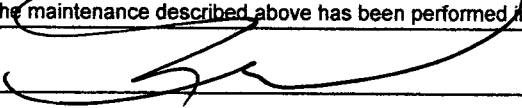
6 STAINLESS STEEL AFT CROSSTUBES, ITEM ID# D350-748-203 , WORK ORDERS ID# 138647, 138648, 138649, 138650, 138661, 138662

5 STAINLESS STEEL FWD CROSSTUBES, ITEM ID# D350-748-103 , WORK ORDERS ID# 137437, 137438, 138714, 137436, 137439

SP15-11-23

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M13 NO CRACK FOUND PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						NOV 20 2015	 
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature: 	ACA/SCA Stamp 	Date: NOV 20 2015
Name: RAFIK MELIKIAN		

QA Closed:

Date:

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order:

P38648

Work Order update only ☐

Part No.

D380-748-203

DISPOSITION

Rework ☒Scrap ☐Use-as-is ☐Suspected Unapproved ☐

AGAINST DEPARTMENT/PROCESS

Skid-tube ☐Machining ☐Thermoforming ☐Large Fab ☐Cross tube ☐Small Fab ☐Finishing ☐Composite ☐Water Jet ☐Prod. Eng. Coord. ☐Rec/Store/Packaging ☐Supplier ☐Engineering ☐Quality ☐Other ☐

Date:

15.11.26

Step #:

QTY Effective:

Description Work Order Deviation

AETC-1032 INSERTS BREAKING ON INSTALLATION

NA

DAS
9
8-00

Disposition

BASED ON ENG TESTING IT WAS FOUND THAT INSTALLATION IS MORE RELIABLE IF INSTALLATION PRESSURE (AIR HOSE) IS REGULATED TO 50 PSI AND INSTALLATION HOLE IS REAMED TO Ø 0.290 IN ACCORDANCE MANUFACTURERS INSTRUCTIONS. OPEN PAR TO ADD NOTE TO STEP # 200 WHICH READS "LIMIT AIR PRESSURE TO 50PSI WHEN INSTALLING AETC-1032 INSERT AND ONLY EXPAND INSERT ONCE"

MRB (QSI042) Approval

A.L.

15.11.26

Completed By

Lead hand / Supervisor
Approval VerificationQC / QA Coordinator
Approval

Root Cause

Environment ☐Design ☐Doc/Data ☐Equip/Tooling ☐Handling/Pre ☐Material ☐Internal Transport ☐Tribal Knowledge ☐LOA ☐Substation ☐Past Expiry Date ☐Misidentified ☐No Re-verification ☐Operator ☐Offset/Setup ☐Supplier ☐Training ☐Use for Testing ☐Poor Information ☐Rushing ☐Product Improvement ☐Process Improvement ☐Manufacturing Process ☐Past Due ☐Pressure/Forced ☐Bending ☐Centre Not Concentric ☐Cracks ☐Crimp/Kink/Ripple/Wave ☐Cuffs ☐Crushing ☐Heat Treat ☐Wave/Twist in Tube ☐Marks/Chatter ☐OTHER: ☐

FAULT CATEGORY

Temperature/Cure ☐Set-up ☐BOM/Route ☐Broken/Damage/Defect ☐Inspection Incomplete/Unqualified ☐Contamination ☐Countersink ☐Cut Too Short ☐Instructions Incomplete/Unclear ☐Drill Holes ☐Power Loss/Surge ☐Folio/Program ☐Grain ☐Weld ☐Wrong Stock Pulled ☐Out of Sequence ☐Off-set ☐Mislabeled ☐Fit/Function ☐Misaligned/off center ☐Positioned Wrong ☐Outside Dimensions ☐Over/Under tolerance ☐Part Incorrect ☐Part Lost/Missing ☐Part Moved ☐Drawing ☐Finish ☐Misread ☐Turning Sequence ☐

4.0 WEIGHT AND BALANCE

The following weight and balance information is for Dart crosstube installations only. This data should be similar to the existing installation. Differences from the parts removed are the responsibility of the installer.

DART CROSSTUBE	FWD/ AFT	WEIGHT	STA	MOMENT
D350-748-101 D350-748-103	Fwd	35.2 lb (16.0 kg)	106.3 in (2.70 m)	3742 lb-in (43.2 kg-m)
D350-748-201 D350-748-203	Aft	34.7 lb (15.7 kg)	162.4 in (4.12 m)	5635 lb-in (64.7 kg-m)

5.0 PARTS LIST

Qty -101	Qty -103	Qty -201	Qty -203	Part Number	Description
X				D350-748-101	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD
	X			D350-748-103	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD (SS)
		X		D350-748-201	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT
			X	D350-748-203	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT (SS)
1				D350-748-141	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD
	1			D350-748-143	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD (SS)
		1		D350-748-241	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT
			1	D350-748-243	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT (SS)
*2	*2	*2	*2	D3502-1	SUPPORT
*2	*2	*2	*2	D5123-7	CLAMP CUSHION
*1		*1		AELS-1032-225	INSERT
	*1		*1	AETC-1032	INSERT
*2	*2	*2	*2	MS21920-20	CLAMP (OR MS21920-21/-22)
*1		*1		MS27039-1-10	SCREW
	*1		*1	NAS1685-3-8	SCREW (OR MS51958-63)
*1		*1		NAS1149D0363J	WASHER (OR AN960JD10)
	*1		*1	NAS1149C0363R	WASHER (OR AN960C10)
4	4	4	4	D3500-1	SADDLE
16	16	16	16	D3501-1	BUSHING
16	16	16	16	AN4-6A	BOLT
8	8	8	8	AN4-41A	BOLT
4	4	4	4	AN5-32A	BOLT
32	32	32	32	NAS1149D0463J	WASHER (OR AN960JD416)
8	8	8	8	NAS1149D0563J	WASHER (OR AN960JD516)
24	24	24	24	MS21042L4	NUT (OR MS21042-4)
4	4	4	4	MS21042L5	NUT (OR MS21042-5)

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/-143/-241/-243 ASSEMBLIES ABOVE

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☒

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☒ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☒ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coor. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐									
Date : <u>16-01-19</u>	Step #: <u>200</u>	QTY Effective : <u>①</u>		MRB (QS1042) Approval DAS 9-89 <u>16-01-18</u>							
Description Work Order Deviation AETC-1032 inserts breaking on installation R.C. equipment, no air regulation on tool		Disposition had on work order to limit air pressure to 50 psi when installing AETC-1032 insert		Completed By DAS 10-89 <u>16-01-19</u> Lead hand / Supervisor Approval Verification DAS 9-89 <u>16-01-19</u> QC / QA Coordinator Approval DAS 9-89 <u>16-01-19</u>							
Root Cause <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; vertical-align: top;"> Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ </td> <td style="width:50%; vertical-align: top;"> No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐ </td> </tr> </table>		Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	FAULT CATEGORY <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%; vertical-align: top;"> Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ </td> <td style="width:33%; vertical-align: top;"> Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ ☒ Broken/Damage/Defect Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ </td> <td style="width:33%; vertical-align: top;"> Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabelled ☐ Fit/Function ☐ Misaligned/off center ☐ </td> <td style="width:33%; vertical-align: top;"> Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐ </td> </tr> </table>				Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ ☒ Broken/Damage/Defect Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabelled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
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